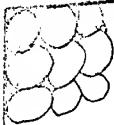


JPRS: 32,070

TT: 65-32563

20 September 1965 /0

086007



(HANDBOOK OF SOVIET STEELS AND ALLOYS)

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20020327 263

JPRS: 32,070

HANDBOOK OF SOVIET STEELS AND ALLOYS

INTRODUCTION

Start

SS, ES, NiB, FeB

This handbook presents a listing of Soviet "EI", "EP", "EYa", and "EZh" steels and alloys and their chemical compositions as compiled from USSR scientific and technical publications. No attempt has been made to categorize or classify these materials under any other nomenclature.

The steels and alloys listed here do not include all the known Soviet steels and alloys, but do represent a good cross section of materials used in various branches of Soviet industry.

A few notes are necessary for the reader to gain full benefit of the contents of this handbook. The symbol "EI" (transliterated from Russian and representing the Russian words "Elektrostal", a steel plant near Moscow) and "Issledovatel'skiy" (experimental), followed by a serial number, in the past has been called a factory designation for experimental steels produced by the Elektrostal' Plant, but the present use of this symbol is not so specific, as indicated by the appearance of the "EP", "EYa", and "EZh" steels and alloys. Many of the "EP" steels were originally developed as high-quality welding wire where the "P" represented the Russian word "provoloka" (wire). Many of these steels are now produced for purposes other than welding wire, but still retain their "EP" designation. The "EYa" steels are chromium-nickel, austenitic stainless steels comparable to the AISI 300 series while the "EZh" steels are chromium, martensitic and ferritic stainless steels comparable to the AISI 400 series.

In addition to the so-called factory designation, Soviet steels and alloys are also identified by a designation which, in most instances, is an abbreviated nominal composition-designation system. For example, steel EI-530 has an alloy designation Kh18N28M3D3. One familiar with these designations would expect this steel to have a nominal composition of roughly 0.1% C, 17-19% Cr, 27-29% Ni, 2.5-3.5% Mo and 2.5-3.5% Cu. A quick check shows that this steel contains 0.12% C, 17.5-19.5% Cr, 27-29% Ni, 2.5-3.5% Mo and 3.5-4.5% Cu. With the exception of copper, the composition of this steel could be estimated quite accurately. And as stated above, this designation is an abbreviated way of indicating a nominal composition and leaves much to be desired as it does not indicate all the elements contained in the steel or alloy (primarily--manganese and silicon). One must be flexible in his approach when working with this particular designation of steels and alloys and not take anything for granted inasmuch as it is far from being standardized.

The specification column which lists the latest known standard serial numbers for these steels and alloys follows the factory designation and alloy designation columns. This system of standards is quite similar to the ASTM standards. Many of these serial numbers are

p. iii

GOST (All-Union State Standard) numbers which were updated in 1961 (GOST 5632-61), while some of the older ones carry other standards (TU, MPTU, ChMTU, etc.).

→ No special effort has been made to fill in the "nearest equivalent" column. Those listed have been mentioned in Soviet literature or U. S. technical publications concerning Soviet materials, or were determined by random comparison with U. S. steels and alloys (on the basis of chemical composition). [is also included]

Below is a table of transliterated Russian letters and the chemical element which they symbolize. In passing it must be noted that the Soviets do not use the letter "A" to represent any chemical element. However, it is found in many alloy designations as a suffix letter to indicate a high-quality alloy steel (or has so been used in the past). The letter "R" represents boron in alloy designations; however, as a prefix, e. g., R18K5F2 (EI-940), it indicates that the material is a high-speed tool steel.

Table of transliterated Russian letters and the chemical element which they represent.

<u>Letter</u>	<u>Element</u>
B	Niobium
D	Copper
F	Vanadium
G	Manganese
K	Cobalt
Kh	Chromium
M	Molybdenum
N	Nickel
P	Phosphorus
R	Boron
S	Silicon
T	Titanium
Ts	Zirconium
V	Tungsten
Yu	Aluminum
Z	Sulfur
Zh	Iron (in nonferrous alloys)

SOVTE "EL" STEELS AND ALLOYS

EL No.	Alloy Designation	Specifi- cation	Nearest Equivalent	Chemical Composition, Percent (maximum unless given as range)													
				C	Mn	Si	P	S	Cr	Ni	Mo	W	V	Al	Cu	B	Co
3	35KhM		ASTI 4337	0.32- 0.38	0.30- 0.60	0.17- 0.37	0.05	0.05	0.80- 1.20	1.40- 1.80	0.25- 0.50						
5	25KhN4			0.25- 0.35	0.30- 0.60	0.17- 0.37	0.010	0.040	0.80- 1.10	1.00- 1.50							
6				0.25- 0.35	0.25- 0.60	0.40	0.030	0.030	0.70- 1.10	3.30- 4.00							
10	25Kh2MFA 25KhM	GOST 4513-61		0.22- 0.29	0.40- 0.70	0.17- 0.37	0.035	0.030	1.50- 1.80	0.40- 0.50	0.20- 0.30				0.15- 0.20	0.20	
10	35KhMFA	GOST 4513-48	ASTM A-193 -55G(F(B-16))	0.30- 0.38	0.10- 0.70	0.17- 0.37	0.035	0.030	1.00- 1.30	0.40- 0.50	0.20- 0.30				0.10- 0.20	0.20	
14	20KhMFA	GOST 4513-57		0.17- 0.24	0.25- 0.55	0.17- 0.37	0.035	0.030	0.70- 1.10	3.75- 4.25					0.15- 0.30	0.25	
16	18KhMVA 18KhMFA	GOST 4513-57		0.14- 0.21	0.25- 0.55	0.17- 0.37	0.035	0.030	1.35- 1.65	4.00- 5.50	0.80- 1.20						
18	25KhMFA 25KhMVA	GOST 4513-57		0.21- 0.28	0.25- 0.55	0.17- 0.37	0.035	0.030	1.35- 1.65	4.00- 5.50	0.80- 1.20						
25	Kh8M36	GOST 4513-51	Elmav	0.10	0.30- 0.60	0.50	0.030	0.030	1.35- 1.65	4.00- 4.50	0.80- 1.20						
36				0.2	(nominal composition)							35- 37					

E.I. No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	Al	Cu	B	Co	Others
49		MTU 232-19	AISI 316	0.10	2.0	1.0	0.035	0.020	16.0-19.0	10.0-14.0	2.0-3.0							
50					0.16-0.24	0.25-0.60			2.4-3.3	0.50-0.55	0.35-0.50	0.60-0.85						
52					0.25				0.2	47.0-49.0								Fe-bal.
59	Kh30		AISI 446	0.15	1.50	0.50	0.035	0.030	26.0-30.0	0.60								
60	Kh13Yu4 Kh13Yu5	GOST	AISI 405	0.15	0.7	1.0	0.035	0.030	12.0-15.0	0.60								3.5-5.5
	Kh15Yu4 Kh15Yu5		9323-59															
66			2XCR7															
69	Kh14Ni14V 4Kh14Ni14ZM	GOST 5632-51	AMS 5700	0.10-0.50	0.7	0.8	0.030	0.030	13.0-15.0	13.0-15.0	0.25-0.40	2.00-2.75						
693	Kh14Ni14VS	GOST 5632-51	AMS 5700	0.40-0.50	0.7	2.75-3.25	0.030	0.030	13-15	13-15	0.25-0.40	1.75-2.25						

RI No.	Alloy Designation	Specifi- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
72	Eh1277S, Kh13W7Se2 3Kh37Se2	GOST 5632-51	AISI 5705A	0.25- 0.37	0.7	2.0- 3.0	0.035	0.030	11.5- 14.0	6.0- 7.5								
73	35Cr15	GOST 4543-48																
83	12Kh2M4A	GOST 4543-57	AISI E3316	0.15	0.30- 0.60	0.17- 0.37	0.021	0.025	1.25- 1.65	3.30- 3.70							0.20	
84	40KhMNA	GOST 4543-57	AISI 4340	0.37- 0.44	0.50- 0.80	0.15- 0.30	0.025	0.025	0.60- 0.90	1.25- 1.65	0.15- 0.25						0.20	
85	Kh8SM, Kh8S2M	GOST 5632-51																
86	8SM	GOST 39																

E.I. No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S.	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
94		GMW 2913-51	Hadfield Ni-Mn steel	0.70- 0.90	0.70- 15.0	0.100	0.030	0.50	2.75- 3.75									
95		GMW 2913-51	AISI 302B	0.20- 0.30	0.40- 0.70	0.030	0.020	17.0- 19.0	8.0- 10.0									
95	Oxide																	
100	Mn13Ni4G9 2Kh13Ni4G9	GOST 5632-61	AISI 202	0.15- 0.30	8.0- 10.0	0.80	0.060	0.030	12.0- 14.0	3.75- 5.0								
103		TU 693																
107	Khlosm, Khlos2M, 3Khlos1MA	GOST 5632-51	Croloy 9	0.35- 0.45	0.30- 0.70	1.90- 2.60	0.030	0.025	9.0	0.50	0.70- 10.5	0.90						

Chemical Composition, percent (maximum unless given as follows)																			
El. No.	Alloy Designation	Specifi- cation	Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co	Others
114	18CrNW			0.14- 0.21	0.25- 0.55	0.15- 0.30	0.05	0.05	1.35- 1.65	4.00- 4.50		0.80- 1.20							
115																			
119	(stainless)				0.75- 0.85	1.50- 1.80			9.50- 10.80										
121																			
122																			
123	TU 635			0.15- 0.25	0.40- 0.80	0.20- 2.3	0.35	0.030	0.030	4.75- 5.75		4.0- 5.0							
126																			

Chemical Composition, percent (maximum unless given as range)

Chemical Composition, percent (maximum unless given as range)																			
El. No.	Alloy Designation	Specifi- cation	Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co	Others
132	Kh18N10T Kh14N12F1T	GOST 5632-51	AISI 317T	0.12	2.0	0.8	0.035	0.030	16.0- 19.0	11.0- 14.0	3.0- 4.0								
133																			
134																			
135																			
136																			
137																			
138																			
139																			
140																			
141																			
142																			
143																			
144																			
145																			
146																			
147																			
148																			
149																			
150	Rh3M																		
151	Rh6M ₄ , 12Kh6M																		
152																			
153																			
154																			
155																			
156																			
157																			
158																			
159																			
160	4Kh8V2	GOST 5950-51			0.35- 0.45	0.20- 0.40	0.35	0.030	7.00	0.25		2.00- 3.00							
161		METU 259h-60	AISI M16	0.55- 0.65	0.30- 0.60	0.30- 0.60	0.030	0.030	6.50	0.30	0.25- 0.35	6.50- 7.50	0.30						

EI No.	Alloy Designation	Specific- ation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
172	Kh17M13CrT	GOST 5632-51	AISI 316T	0.12	2.0	0.8	0.035	0.030	16.0- 19.0	11.0- 14.0	2.0- 3.0	0.3- 0.6						
173	Kh12FT				1.0-	0.40	0.35	0.040	0.030	11.0- 13.0	0.9- 1.6				2.0- 2.6			
174					0.50-	0.40	0.35	0.010	0.035	8.0- 10.0	0.6	2.0- 3.0	1.0- 1.6					
175					1.00													
176																		
177																		
178	30XGGS, 30XGCSA	GOST 4543-57		0.25-	0.80-	0.83-	0.040	0.040	0.80- 1.10	0.25					0.20			
179				0.35	1.10	1.20												
180	Kh25	GOST 5632-51	AISI 446	0.20	0.80	1.00	0.035	0.030	23.0- 27.0	0.60								
181																		
182																		
183	Kh19NM		AISI 316	0.14	2.0	0.80	0.035	0.036	17.0- 20.0	8.0- 10.0	2.5- 3.0							
184	R4				0.80-	0.40	0.50	0.040	0.035	7.0	0.35	3.5		1.0- 1.5				
185	15NM	GOST 4543-48	AISI 4615	0.10	0.10	0.17	0.010	0.010	0.30	1.50	0.20				0.30			
				0.18	0.70	0.37				2.00	0.30							

EL No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Ca	B	Co
1593	TU 193	AISI S-1	0.70- 0.85	0.20- 0.40	0.10- 0.70	0.030- 0.030	0.030- 1.40	1.10- 0.25	1.10- 2.00	2.70								
1595	15NiCrSA 20NiCrS	GOST 453-57	0.17- 0.23	0.80- 1.10	0.20- 1.20	0.035- 0.035	0.035- 1.10	0.60- 0.25	1.10- 1.10	0.20								
2093	Kh40ChV		0.35- 0.45	13.0- 15.0	1.40- 1.80	0.030- 0.030	0.030- 15.0	13.0- 15.0		2.0- 2.8								
211	K20MnS, Kh20M- 14S2, 1Kh20Mn4S2	GOST 5632-61	0.20	1.50	2.0- 3.0	0.035	0.030	19.0- 22.0	12.0- 15.0									

EI No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	Sn	Co
229	Kh13, 9Kh18	GOST 5632-51	AISI 440C	0.90-1.00	0.70	0.80	0.035	0.030	17.0-19.0	0.60								
230	Kh14N4SV2M		ANSI 5700															
231	Kh14	GOST 5632-51	AISI 420	0.15	0.70	0.60	0.030	0.030	13.0-15.0	0.60								
233																		
234																		
235	Cr13, Cr13L	GOST 2176-57	Hadfield steel	0.9-1.3	11.5-14.5	0.5-1.0	0.12	0.05	0.5	0.5								
237	Kh14N4SV2M	GOST 5632-51		0.15	0.7	0.8	0.035	0.030	13.0-15.0	0.45	2.0-2.75							
238	Kh14N4SV2M	GOST 5632-51		0.15	0.7	0.8	0.035	0.030	13.0-15.0	0.45	2.0-2.75	0.6						
239		AISI L4		0.95	0.95	0.25-	0.03	0.03	0.95	1.15	1.15							

El No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent. (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	P	Co
260																		
261	R1233N	GOST 5632-51	ASTI 446	0.35	0.7	2.5-	0.35	0.035	0.030	23.0-	0.7-							
262	R-9	GOST 5952-51		0.85- 0.95	0.40	0.10	0.40	0.030	0.030	3.8- 4.4	0.4	0.3	8.50- 10.00		2.00- 2.60			
263	R11742	GOST 5632-61	ASTI 431	0.11- 0.17	0.80	0.80	0.030	0.025	16.0-	1.5-								
264	55G5Ti20	ChMnU 2953-51		0.50- 0.60	4.0- 5.5	0.60	0.050	0.030	0.25	18.5- 21.5								
265																		
266																		
267																		
268																		
269																		
270																		
271	15702C2T	ChMnU 254		0.13- 0.18	1.10- 1.70	0.17- 0.37	0.035	0.035	1.50-	0.50						0.05-		
272	40Mn2Cr5	ChMnU 254		0.35- 0.42	0.70- 1.10	0.17- 0.37	0.035	0.035	1.50-	0.50	0.25-					0.12		

Chemical Composition, percent (maximum unless given as range)																			
El No.	Alloy Designation	Specific- cation	Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co	Others
275				1.00- 1.15	0.40 0.40	0.40 0.35	0.010 0.010	0.030 0.030	3.80- 4.40	0.35 0.40	2.30 2.30	2.20- 2.90		2.20- 2.80					
277				1.10- 1.25	0.40 0.40	0.40 0.60	0.010 0.010	0.030 0.030	3.80- 4.60	0.40 0.40	2.30 2.90	2.20- 3.30		2.80- 3.30					
278	N35KhV			0.70- 0.80	2.00- 3.00	0.60 0.80	0.04 0.04	0.030 0.030	7.0- 9.0	33.0 35.0	3.0- 4.0								
283	K22Mn2S2	60Si 5632-61	AMS ANSI 310B	0.20	1.5	2.0- 3.0	0.035 0.010	0.020 0.030	23.0- 27.0	18.0- 21.0									
285				0.90- 1.10	0.40 0.40	0.35 0.35	0.010 0.010	0.030 0.030	4.00 5.00	0.40 0.40	3.70- 4.50	3.00- 3.70		2.00- 2.60					
288	35KhGS	60Si 45L3-48												(Same as El. 75)					
289	65Si2V2A, 65Si2A	60Si 20Si2-53		0.60- 0.70	1.50- 1.00	0.40- 2.00	0.035 0.040	0.030 0.040	0.40 0.35	0.40- 4.30	0.80- 1.20								
290				0.90- 1.05	0.40 0.40	0.40 0.40	0.040 0.040	0.035 0.035	3.60- 4.30	0.35 0.35	2.60- 3.30	2.60- 3.30		1.50- 2.00					
292	0.9Kh25KhV	60Si 5632-61		0.06	0.70	1.20	0.030	0.030	23.00- 27.00	0.60	0.20	4.50- 6.50							

ET No.	Alloy Designation	Specific- cation	Chemical Composition, percent (maximum unless given as range)												
			C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	Al	Cu	B
221			1.50- 1.65	0.45- 0.95	0.75- 0.95	0.03	0.25	0.03	0.5						
223		AISI M2	0.80- 0.95	0.40	0.35	0.040	0.030	3.70- 4.50	0.40	4.0- 4.5	5.0- 6.0	2.0- 2.6			
267	CrMnW 2913-51	AISI 310B	0.20	0.20- 0.70	1.2- 2.0	0.035	0.030	24.0- 27.0	18.0- 21.0						
303			0.07- 0.12	0.80	1.4- 2.0	0.035	0.030	8.0- 11.0	0.30			0.40- 0.70			
310	Mn20Cr5N Kh18N65N	CrMn 254	0.12	1.6	(Indicated composition)			19-21	5-7	0.2- 0.4	0.8- 1.3				
312	Kh18N46	CrMn 254	0.35	3.00	1.40- 2.00	0.040	0.030	17.00	5.00						
313			0.45	5.00				20.00	7.00						
			0.90	0.40	0.35	0.040	0.030	10.00	0.50	12.0	1.20	2.40- 2.80			

EL No.	Alloy Designation	Specific cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given in range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
314				0.78- 0.88	0.40	0.35	0.04C	0.03C	7.90- 9.10	0.90- 1.20				2.40- 2.80				
315	Kh25M1L																	
316				0.20	2.0	1.0	0.035	0.035	22-26	10-12 (Estimated composition)								
318	0Kh17Ni5	GOST 5632-61		0.06	0.70	0.60	0.035	0.030	16.0	0.60				0.20	4.00- 6.00			
319	Kh23M1.3 Kh25M1.5	GOST 5632-61		0.20	2.00	1.00	0.035	0.025	22.0- 25.0	12.0- 15.0								
325	6KhS	GOST 5050-51		0.60	0.40	0.60	0.030	0.030	1.00- 1.30	0.25								
326		TUT79		0.40- 0.50	1.35- 1.65	0.80- 1.30	0.030	0.030	2.50- 3.00	0.25				0.80- 1.20	0.20- 0.40			
329				0.40- 0.50	0.40	0.80- 1.20	0.030	0.030	11.0- 12.5	0.50				1.30- 1.80	0.70- 0.90			
330				0.40- 0.50	0.20- 0.40	1.10- 1.70	0.030	0.030	6.0- 8.5	0.50				0.60- 0.80	1.20- 1.60			

Chemical Composition, percent (maximum values given as range)											
El No.	Alloy Designation	Specifi-cation	Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	No.
349	M2S (M2E-27)	GOST 5632-61	AISI 446	0.15	0.80	1.00	0.035	0.022	27.0-30.0	0.60	
358	40K25VA			0.35-0.45	0.65-0.95	0.17-0.37	0.03	0.03	0.75-1.05	0.60-0.90	0.50-0.80
359	40K25VTE			0.35-0.45	0.55-0.95	0.17-0.37	0.03	0.03	0.75-1.05	0.60-0.90	0.15-0.25
359	Kh35	GOST 5950-51		0.95-1.10	0.80-1.20	0.50-1.00	0.030	0.030	1.40-1.80	0.25	
365				1.30-1.45	0.30-0.50	1.0-1.25	0.030	0.022	0.03	0.20	* (*0.2-0.4 total)
369	15KhGIVVA	GOST 320-69		0.12-0.19	0.65-0.95	0.17-0.37	0.03	0.03	0.75-1.05	0.60-0.90	0.50-0.80
369	15KhGIVMA	GOST 320-60		0.12-0.19	0.65-0.95	0.17-0.37	0.03	0.03	0.75-1.05	0.60-0.90	0.15-0.25
370	30KhGIVVA			0.24-0.34	0.65-0.95	0.17-0.37	0.03	0.03	0.75-1.05	0.60-0.90	0.50-0.80

EL No.	Designation	Specific cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
373	3070 C.R.22			0.24- 0.34	0.65- 0.95	0.17- 0.37	0.03	0.03	0.75- 1.05	0.60- 0.90	0.15- 0.25							
376	413182M																	
380				0.80- 0.95	0.40	0.35	0.010	0.035	7.0- 9.0	0.6- 0.9					2.0- 2.5	2.4- 2.8		
381				0.82- 0.92	0.40	0.35	0.010	0.035	6.0- 7.0	0.40					3.5- 4.5	2.8- 3.2		
382				0.80- 0.90	0.40	0.35	0.010	0.035	4.5- 5.5	0.40					4.0- 5.0	1.8- 2.3		
383				0.27- 0.37	0.20- 0.40	0.35	0.035	0.035	3.0- 4.0	0.50					1.80- 2.40			
385				0.85	0.40	0.30	0.040	0.030	4.0- 5.0	0.35					4.0- 5.0	1.5- 2.0	0.50- 0.80	
388	K15GHTM HR15GHTM	GOST 5632-61		0.38- 0.47	6.0- 8.0	0.9- 1.4	0.045	0.020	14.0- 16.0	6.0- 8.0	0.65- 0.95					1.5- 1.9		

EI No.	Allow. Design.	Specification	Recrest Equivalent Equivalent	Chemical Composition, percent (maximum unless given as range)													
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B
391																	
				0.50- 0.60	0.20- 0.35	0.15- 0.30	0.030	0.030	0.40- 0.60	0.30				0.15- 0.35			
395	Kh18N10 Kh18N10S	GOST Kh1526M5 Kh162515AS	Timken	0.12	1.0- 2.0	0.50- 1.00	0.030	0.030	15.0- 17.5	24.0- 27.0	5.5- 7.0						Nb-0.10- 0.20
397																	
398	Kh18N11B	GOST 5632-51		0.10	2.0	1.0	0.030	0.030	17.0- 20.0	9.0- 13.0				(same as E-132)		Nb-0.05- 0.15 up to 1.5 wt%	
400	Kh18N2M	ChMTU 5216-55		0.07	1.5	0.030	0.030	16.0- 19.0	11.0- 14.0	2.0- 3.0							
401	<u>Kh18-1Mo</u> <u>Kh18-Mo</u>	MPTU 2362-49		0.10	2.0	1.0	0.030	0.020	16.0- 19.0	10.0- 14.0	2.0- 3.0						
402	Or18M2B	GOST 5632-61		0.08	1.00- 2.00	0.80	0.035	0.020	17.0- 19.0	11.0- 13.0						Nb-SiC up to 1.5 max Nb-0.7- 1.1	
403				0.12	0.90- 1.50	0.70- 1.20	0.035	0.020	16.0- 19.0	14.0- 17.0	2.0- 2.6					Nb-0.9- 1.3	

E.I. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (fraction unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
423	E112-S 1Kh13Yu	GOST 5632-61		0.07- 0.12	0.70- 2.0	0.030- 0.025	1.2- 14.0	0.5							1.0- 1.8			
425	1Kh16N13M2B			0.12	0.50	0.50- 0.80	0.030	0.025	15.0- 17.0	12.5- 14.5	2.0- 2.5						Nb-0.9- 1.3	
425	1Kh16N12M3 1Kh15N5MB			0.12	0.50	0.80- 1.00	0.030	0.030	15.0- 17.0	12.5- 14.5	1.5- 2.0						Nb-0.9- 1.3	
429	(stainless)																	
433																		
433																		
433	ChMTU 5216-55			0.12	5.00- 6.00	1.80- 2.60	0.05	0.03	18.00- 21.00	6.50- 8.00								
433																		
435	20Kh3M2F 20Kh3M2DA VK-36	MPTU 2362-19		0.16- 0.24	0.25- 0.60	0.40	0.035	0.030	2.4- 3.3	0.5	0.35- 0.55	0.30- 0.50	0.60- 0.85					
436	Kh23M18	GOST 5632-51	AIST 310	0.2	2.00	1.00	0.035	0.030	22.0- 25.0	17.0- 20.0						45	Fe-1-3%	
436	KhN73, Kh15N75			0.12	1.0	0.8			13.0- 15.0	275							Fe-2.0%	

El No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)													
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Ca	B
422			Nimonic 75						(same as El. 435)								
422	Rh20Nb30Ti3	GOST 5632-51	Nimonic 80	0.08	0.5	1.0	0.020	0.015	19.0-23.0	bal.		2.0-2.9		0.4-1.1	0.2		Fe-2.5%
423				0.6-	0.8-	0.2-	0.030	0.030	2.5-3.2	9.0-							
423				0.7	9.0	0.4											
424				0.10-	0.40-	0.40-	0.030	0.030	14.0-16.0	28.0-32.0				1.5-2.0			
424				0.16	0.90	0.90											
425	Rh55Ru	GOST 5632-61		0.15	0.50	1.20-	0.030	0.025	5.50-7.70	0.30				0.20		0.70-1.10	
429		ChMTU 5212-55		0.15-	6.0-	0.5-	0.035	0.030	11.0-15.0	10.0-13.0							
431				0.25-	0.20-	0.35	0.030	0.030	2.20-2.70	0.25		4.0-5.0		0.50-0.80			
432	Rh17Mn3Nb	GOST 5632-61		0.10	1.00-	0.80	0.035	0.020	16.0-18.0	12.0-14.0		0.30-0.60					
434	RhMOK			0.32-	0.50-	0.50-	0.035	0.035	12.0-14.0	11.5-13.5	1.8-2.4	2.5-3.5	0.06-0.15	0.05-0.10		9.0-11.0	Nb-1.0-1.5
435	Rh20Nb30Ti, RhNi75	GOST 5632-61	Nimonic 75	0.12	0.70	0.80	0.020	0.015	19.0-22.0	bal.		0.15-0.35					Fe-6%

E.I. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)											
				(Same as E.I. 422)											
427			Wmonic 80												
428	Ru7Ti4	GOST 5632-61		0.06 0.4	0.6	0.015	0.037	19.0- bal.	22.0	2.3- 2.7	0.55- 0.95				Fe-1.0% Ce-0.01%
429	Ru7Ti4RuR	GOST 5632-61		0.06 0.40	0.60	0.015	0.037	19.0- bal.	22.0	2.3 2.7	0.55- 0.95				Fe-1.0% Ce-0.01% P-0.01
430	Ru25T	GOST 5632-61	AISI 446	0.15 0.80	1.0	0.035	0.025	24-27	0.6	5-6% up to 0.8					
432	Ru7Ti7	GOST 5632-61	Nichrome	0.07 0.5	0.8	0.02	0.02	29-31	bal.		0.15				Fe-5.0
434															
435	Ru5Ti4Ru							20	bal. 4 (chromium composition)	2.5	0.7				
436	Ru18Ni5Ti2RuR			0.08 0.5	0.6	0.01	0.010	17-20	bal. 4-5	2.5	1-1.5	0.01			Fe-1% Ce-0.01%
438	Ru18Ni12Ti2	GOST 5632-61		0.08 0.5	0.6	0.015	0.01	17.0- 20.0		4.0- 5.0	2.2- 2.8	4.0- 5.0	1.0- 1.5	0.01	Fe-4.0% Ce-0.01%
439	Ru18Ni12Ti2	GOST 5632-61		0.10 1.2	0.8	0.03	0.020	16-17	12-14	1.6- 0.6	0.3- 0.6				

ET No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)										Others S or Te 0.13- 0.35 M-1.3	
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Al	Cu	
452	Kh18NiCr(18)			0.12	1-2	0.80	0.035	0.020	17-19	9-11					
453	12Ni2Cr3			0.12	0.4-0.7	0.7	0.035	0.030	2.1-2.6	0.30	0.8-1.0				
457	Kh23N (similar to ET-657)			0.09	0.54	0.46	0.021	0.012	25.05 (actual analysis)			0.30			
459				0.12	5.5-7.0	1.0	0.053	0.030	14.0-16.0	12.0-14.0					
460	M-20	Hastelloy A	0.12	1.5	1.0	0.03	0.03		55-59	18-21					Fe 18-22
461	M-30	Hastelloy B	0.12	1.0	1.0			1.0	67-69	21-33					Fe-3-7
462			0.05	1.0-2.0	0.20	0.030	0.030	45.0-48.0							
464		TU 903	0.12	1.88	0.53				20.45 (actual analysis)						
465			0.15	0.50	1.25-2.0	0.055	0.030	22.5-25.0	0.50			1.5-2.25			

Chemical Composition, Percent (maximum unless given as range)									
D	E	F	G	H	Mg	Ni	W	Al	Cu

E.I. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, Percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
425																		
425																		
425	0Kh13, 08Kh13	GOST 5632-61	AISI 403	0.08	0.60	0.60	0.030	0.025	11-13									
429	Kh28N Kh28TN	CMITU 3296-55	AISI 446	0.15	0.5	1.0	0.035	0.030	27-30	1.0- 1.7								N ₂ -0.15 -0.22
500	16Kh2GN2VA			0.14- 0.19	1.10- 1.40	0.17- 0.37	0.035	0.035	1.70- 2.10	1.70- 2.10								
500	16Kh2GN2VMA			0.14- 0.19	1.10- 1.40	0.17- 0.37	0.035	0.035	1.70- 2.10	1.70- 2.10	0.50- 0.80							
502				0.10	5.0- 7.0	0.85	0.020	0.020	18.0- 22.0	9.0- 11.0								
503	G9N9, 50N9G9			0.45- 0.55	0.8- 9.0	0.17- 0.37			0.2	8.0- 9.0								
503	M9R9G9			0.50- 0.65	7.5- 9.5	0.7			3.8- 4.5	8.0- 10.0								
504	TR T52			0.12	1.50	0.90	0.03%	0.03%	16.0- 18.0	11.0- 14.0	2.0- 2.8							2.5- 3.5

No. Re.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Ca	B	Co
553	Rh23M23V3D3	GOST 5632-51		0.10	0.25- 0.50	0.50- 1.0	0.035	0.030	22.0- 25.0	22.0- 25.0	2.5- 3.5					2.5- 3.5		
554																		
555																		
556																		
557																		
558																		
559																		
559A	Rh25M25V3	GOST 5632-61																
	Rh16M60Yu3																	

EN No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)									
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti
555													
557	15Kh3MA	GOST 4689-54		0.15- 0.70	0.40- 0.37	0.17- 0.37	0.030	0.030	2.5- 3.0	0.40	0.20- 0.30		
562	10NM												
572	3Kh19N9MVF 2Kh18N8MVF	GOST 5632-61		0.12- 0.70	0.40- 0.35	0.15- 0.35	0.030	0.030	0.2	1.0- 1.5	0.4- 0.55		
573	N34KhGB	TU 639											
575	12KhMFT 12Kh1MFT	GOST 2570-54		0.7- 0.8	2-3	0.5	0.04	0.03	7-9	33-35	2-4		
576	Kh5VF, 12Kh5VF	GOST 2937-51											

El No.	Alloy Designation	Specification	Chemical Composition, percent (maximum unless given as range)																	
			Nearest Equivalent			C	Mn	Si	P	S	Cr	Mo	W	Ti	V	Al	Cu	B	Co	Others
573	Kh3M7	MTU 4220-53		0.15-0.25-0.20	0.40-0.50	0.030	0.030	2.5-3.0	0.25	0.50-0.70	0.50-0.70	0.05								
575	Kh3MVF	CaMTU 4803-54	0.	0.16-0.25-0.22	0.40-0.50	0.030	0.030	2.5-3.0	0.25	0.35-0.50	0.30-0.50	0.70-0.85								
576	Kh3MVB	CaMTU		0.16-0.25-	0.40	0.030	0.030	2.87 (actual analysis)		0.48	9.40	0.40						Nb-0.65		
580	Ch17Ni6.34	GOST 5632-61		0.08	2.0	0.20-0.80	0.030	16.0-18.0	1.5-0.17.0	3.0-3.5	0.3-0.5									
581																				
582						0.05-0.10	0.55-0.85	0.15-0.30		0.7-1.0	1.4-1.8	0.20-0.30								
585	35KhVTA	GOST 4543-57		0.35-0.43	0.20-0.40	0.17-0.37	0.035	1.50-1.80			0.20-0.40		0.40-0.70							
589																				
590																				
592	Kh16M13B3 (Kh16M13M3B)	CaMTU 5633-56		0.06-0.07	0.6-0.7	0.13					15-17	12-15	2.50-3.25	(0.5)					(Nb-1.25)	

E.I. no.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum values given as ranges)														
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	Al	Cr ₂	B	Co	Others
527	ChNi3Mn5A	GOST 9232-59		0.05	0.30	0.60	0.015	0.015	21.5- 23.5						4.5- 5.10			
528	KhNiMnTiB3	GOST 5632-61		0.12	0.5	0.6	0.015	0.010	16.0- 19.0	bal.	4.0- 6.0	2.0- 3.5	1.9- 2.8	0.1- 0.5	1.0- 1.7	0.1	Fe-5- Ce-0.2- Nb-0.5%	
602	KhNi7Mn3Yu	GOST 5632-61		0.10	0.40	0.80	0.020	0.012	19.0- 22.0	bal.	1.80- 2.30	1.80- 2.30	0.75	0.35- 0.75			Nb-0.50- 1.30- Re-8	
603	KhNi3	GOST 5950-51		1.05	0.20- 1.15	0.40	0.15- 0.35		0.40- 0.70									
605	OrNi18Mn9S			0.09	0.89	1.8			18.3	9.1			0.25					
605	OrNi18Mn9F2S OrNi19Mn9S2 05Kh19N9G3S2	ChMTU 3378-53		0.07	1.0- 2.0	1.3- 1.8	0.030	0.030	18.0- 20.0	8.0- 10.0				2.2- 2.7				
606A				0.07	0.70	1.30- 1.80	0.030	0.030	18.0- 20.0	8.0- 10.0				2.20- 2.70				
607	KhNi3Mn7Yu			0.08	1.0	0.8	0.015	0.01	15.0- 18.0	bal.				1.8- 2.3	0.5- 1.0	Re-3.0- Nb-1.0- 1.5		
607A				0.08	1.0	0.8	0.020	0.020	15-17	bal.				1.4- 1.8	0.5- 1.0	Re-3.0- Nb-1.0- 1.5		
608	Kh25Mn4S2			0.12	2.0	2.0	(estimated composition)		21-23	13-15								

E.I. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)												
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Al	Cu	B	Co
612	K41135, Mn35Ti K41135V1 K41135Ti3T Mn41135Ti2T	ASTI 330Ti GOST 562-61	0.12 2.0	1.0- 0.6	0.020 0.020	14.0- 16.0	34.0- 38.0				2.8- 3.5	1.1- 1.5				
613																
614				0.15	(compatibility limited within indicated limits)				10-20 30-40		1.1- 1.5					
615				0.10 2.0	1.0- 0.5	0.020 0.020	11.0- 16.0	34.0- 38.0			2.8- 3.5	1.2- 1.6				
616	Mn20Mn05Ti	ChMTU	0.10 8.0	6.0- 1.00	0.60- 1.00	0.030 0.025	18.0- 22.0	8.0- 10.0			0.60- 0.90					
617	Longsteel			0.40 1.3	1.0- 0.7	0.030 0.7	0.4- 0.7	1.5- 2.0	0.20- 0.30		0.1					
618	Mn15-3			0.12 0.06	0.5 0.35	0.015 0.015	13.0- 16.0	bal. 4.0	2.0- 7.0	1.8- 2.3	0.1- 0.5	1.7- 2.3	0.02	Fe-5.0 Ca-0.02	Fe-1.0	0.00- 0.003
619									(same as for E.I.-826)							

EL No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, Percent (maximum values given as ranges)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cr	N	Co
G52	Kh17Ni, CHALITE	GOST 5632-61		0.08	0.70	0.80	0.035	0.035	16-18				5%	0.8%				
G57	Orn18N9S2																	
G59	CHROM-NIRES Kh18N9S2Nb	GOST 3211-52		0.06	1.00- 2.00	2.0- 2.75	0.030	0.020	18.0- 20.0	8.0- 10.0								Nb-1.0- 1.2
G63																		
G52	RuN70Yu	GOST 5632-61	Inconel 702	0.10	0.3	0.8	0.02	0.02	26-29	bal.								Fe-1 Ce-0.03 P-0.01
G54																		
G57	Kh22Mn (similar Kh22Mn to EL-457)	GOST 5632-61		0.15	1.50	1.00	0.033	0.025	25.0- 28.0	1.00- 1.70								N-0.18- 0.25

E.I. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (minimum unless given as range)													
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B
672	23ER27Ra			0.19- 0.25	0.30- 0.70	0.17- 0.37			1.6- 2.4	0.8- 1.2	1.0- 1.4		0.15- 0.23				
674																	
675																	
676																	
677																	
678																	
679																	
680	1KM16M3E2B																
681	1392Ra	ChMTU 3626-53			0.15	1.6- 1.9	0.12	0.030	0.030	1.2- 1.5							
683		ChMTU 3626-53			0.10	1.6- 1.9	0.12	0.030	0.030			0.40- 0.50					

Chemical Composition, percent (maximum unless given as range)																			
El No.	Designation	Specific cation	Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co	Others
601		ChMnU 4176-53		0.06	1.0	0.60	0.030	0.020	17.0- 19.0	10.0- 12.0									
602																			
603		MnTU 4270-53		0.06- 0.13	1.0- 1.7	0.30	0.030	0.020	16.5- 18.5	12.5- 14.0	2.1- 2.6								
604	380mV	MnTU 4272-53		0.35- 0.42	0.30- 0.60	0.17- 0.37	0.040	0.040	1.25- 1.65	1.35- 1.75	0.60- 0.50								
605																			
606		K015N35VET K015N35VER (K015N35VET2) (K015N35VER2)	(same as El-612)- (K015N35VET3T)- (K015N35VET3T)	0.12	1.0	0.6	0.020	0.020	12.0- 16.0	32.0- 36.0	2.0- 3.0	2.3- 3.3	1.1- 1.5					0.020 Ce-0.25	
607		{K015N35V3T} (K015N35VER)																	
608		{K015N35VET5} (K015N35VER10)																	
609	MnOx	ChMnU 5019-55		0.05	0.30- 0.70	0.15- 0.40	0.030	0.020	0.70- 1.10	14.0- 15.0	4.0- 4.5					0.15		Fe-bal.	
610	K014N16B K014N16B	ChMnU 2966-51		0.07	1.0- 0.12	0.60- 2.0	0.035	0.025	13.0- 15.0	14.0- 17.0								Nb-0.9- 1.3	
611	1Kh13Ni8V2B Kh14Ni8V2B	ChMnU 2966-51		0.07	1.0- 0.12	0.60	0.035	0.025	13.0- 15.0	18.0- 20.0	2.0- 2.75							Nb-0.9- 1.3	
612	1Kh13Ni8V2B Kh14Ni8V2B Kh14Ni8V2B Kh14Ni8V2B	GOST 5632-61		0.07	1.0- 0.12	0.60- 2.0	0.035	0.026	13.0- 15.0	18.0- 20.0	2.0- 2.75					0.005		Nb-0.9- 1.3	

EI No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)										
				C	Mn	Si	P	S	Cr	Ni	No	V	Al	Cu
62	Kh10Ni32R Kh12Ni32Ti3R	GOST 5632-61		0.10	1.0	1.0			10.0- 12.5	16.0- 21.5		2.5- 3.2	0.8	0.003 0.02
63		GOST 5632-61		0.10	1.0	1.0			10.0- 12.5	18.0- 21.0		2.3- 2.8	0.5	0.003
64	Kh12Ni32Ti3R	GOST 5632-61		0.10	0.6	0.6			10.0- 12.5	21.0- 25.0	1.0- 1.6	2.2- 2.6	0.8	0.003 0.02
701														
702	N36Ni32Ru, 36Ni32Ru			0.70	1.55	0.30	0.03	0.021- (electrolytic analysis)	2.75	9.2		0.50		
703	KhN33P Kh22Ni38V1T	GOST 5632-61		0.05	0.8- 1.2	0.5			11-13	34-36		2.8- 3.2	0.6- 0.8	
704				0.06	0.70	0.80	0.030	0.002- 0.12	20.0- 23.0	35.0- 39.0		2.80- 3.50	0.70- 1.20	0.50
705	R9K5	GOST 9373-60		0.80- 0.90	0.10	0.40	0.030	0.030	3.80- 4.40	0.40		9.0- 10.5	1.60- 2.00	
706	R9P5	GOST 9373-60		1.4- 1.5	0.40	0.40	0.035	0.035	3.80- 4.40	0.40	0.30	9.0- 10.0	4.4- 5.0	
711	Kh14Ni4Nb3T Kh14Ni3G13T	GOST 5632-61		0.10	13-15	0.80	0.035	0.025	13-15	2.5- 3.5	5xC -0.2 -0.5%			Mn-C 0.90

EI No.	Alloy Designation	Spectrally cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)												
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	Al	Cu	B
712	12Kh2NVA			0.09- 0.16	0.3- 0.70	0.17- 0.37			1.9- 2.40	0.8- 1.20	0.15- 0.25	1.0- 1.40	0.18- 0.28			
733				0.07	0.57	0.16			14.95	16.45	0.8	2.63			0.01	Nb-0.85
734				0.06	0.55	0.46	(actual analysis)		15.58	16.45	0.75	2.60				Nb-0.83 Ni-0.1
735																
736				0.06	1.56	0.47	(actual analysis)		18.0	13.1	0.68	0.58	0.51		0.01	
737																
738	70SSKhMVA			0.71	0.51	2.49	0.016	0.62		0.2	0.6					
739	25Kh2MVF, TsZh-4 25Kh2MFA, 25Kh2M	ChMTU 5661-56		0.22- 0.30	0.50- 0.80	0.17- 0.37	0.030	0.030	2.1- 2.5		0.20- 1.1		0.30- 0.60			
740	25KhMFB			0.22- 0.30	0.50- 0.80	0.17- 0.37	0.030	0.030	2.1- 2.5		0.90- 1.1		0.3- 0.5			Nb-0.5- 0.8
741	1Kh16M13B Kh16M13V	ChMTU 2894		0.07- 0.12	0.8- 1.5	0.7	0.035	0.035	15.0- 17.0	12.5- 14.5						Nb-1.4% Ti-1.5% Ce-0.02% (0.65B)
742	Kh15N35VT- KhN35VT	GOST 5632-61		0.10	1.0	0.6			14.0- 16.0	35.0- 38.0	4.0- 5.0	1.1- 1.5				
743	(Kh15N35VT) (KhN35VT)															
744																

EI No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)										Nb-0.9- 1.3 Ce-0.2	
				C	Mn	Si	P	S	Cr	Ni	Mo	W	V	Al	
725	13Al3Mn8V2FR 13Al4Mn8V3ER			0.08- 0.12	1.0- 2.0	0.6	0.020	0.025	13-15	18-20	2.0- 2.75				0.02
729															
732	03Ni20Mn4S2 5632-61	GOST 5632-61		0.18- 0.23	17.0- 20.0	0.8	0.1	0.03	12.0- 14.0	0.5			0.5- 0.8		
734		GOST 5632-61													
735	13Kh14N9TiA 5319-57	CrMoTi 5319-57		0.10- 0.16	0.6	0.6	0.030	0.030	13-16	2.8- 3.4		1.1- 1.4	1.25- 1.55		0.005
736	13Kh14N9TiVR 5319-57	C MoTi 5319-57		0.10- 0.16	0.6	0.6	0.030	0.030	13-16	1.9- 2.4		1.6- 2.2	0.05	0.16- 0.26	0.001
743													(same as EI-381)		

EI No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cr ₁	B	Co
721				0.17	0.48	0.19	0.028	0.028	12.4	0.60	1.08 (actual analysis)			0.27				
723						0.18	0.50	0.16	0.018	0.010	12.3	0.68	0.98		0.27			
729						0.17					12.9	0.65 (nominal composition)						Zr-0.6
733	140KhMn	GOST 5635-56																0.002- 0.005
734						0.09	0.79	0.20	0.023	0.016	10.76	0.20	0.73 (actual analysis)		0.21			Nb-0.25
735	Kh11V1	ASTI 422				0.13	0.79	0.38	0.012	0.012	10.85	0.31	0.73 (actual analysis)		0.09			Nb-0.37
736	1Kh12Y2RF	GOST 5632-61				0.10	0.50	0.50	0.030	0.025	11.0	0.60	1.70 (actual analysis)		0.15- 0.30			
737	1Kh12Y4RF	GOST 563461				0.10	0.60	0.20	0.030	0.030	10.5- 12.5	0.60	3.7- 4.2	0.20- 0.30				
738	Kh17Ti2V	Kh15Mn7Ti2V2Cr				0.11	0.9				14.6 (actual analysis)	4.17	5.05 4.2	1.22 5.2	1.3	1.94	0.005	Re-0.76
739																		

PT. No.	Alloy Designation	Specific- ation	Recent Eqv. Alent	Chemical Composition, percent (maximum unless given as range)										
				C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	
702	Kh13M1C ₄ (Kh13M16C2)		0.07- 0.12	1.0- 2.0	0.6	0.030	0.025	13.0- 15.0	14.0- 17.0		0.6- 1.0			(0.10) Ce=0.020
703	Kh13M18V2R Kh13M18V2TR		0.07- 0.12	1.0- 2.0	0.6	0.030	0.025	13.0- 15.0	18.0- 20.0	2.0- 2.75	0.6- 1.0			0.002 Ce=0.020
703	Kh16M13B Kh16M13B													
703			0.07- 0.12	0.8- 1.7										Mn-10.5 up to 1.2% max
703			0.05	0.77	0.24									
703														
735	Kh14M28Ti3YbR Kh14M25Ti3YbR	GOST 5632-61	0.08	0.60	0.60				13-15	26-29	2.8- 3.5	2.4- 3.2		0.5- 1.0
767	Kh15M13Ti3YbR Kh15M35Ti3YbR	GOST 5632-61	0.08	0.60	0.60	0.020	0.012	12.0- 16.0	33.0- 37.0	2.80- 3.50	2.40- 3.20		0.5- 1.0	0.020
790														
793	Kh18MgTbU	ChMTU 5257-55	-	-	-	-	-	-	-	-	-	-	-	0.5- 0.5%

El. No.	Alloy Designation	Specifi- cation	Nearest Equivalent	Chemical Composition, Percent (including impurities given as range)														
				C	Mn	Si	P	S	Cr	Mo	W	Ti	V	Al	Cu	B	Co	Others
73.3	06Cr11VF			0.10	2.0	1.0	0.03	0.03 (estimated composition)	10-12		1-2	0.5					Nb-0.4-	0.7
800																		
800.1																		
801	25Cr11M3F																	
802	1Kh12V1MF	GOST 5632-61		0.12	0.5	0.4				11.0-13.0	0.4-0.8	0.5-0.7					0.15-0.30	
802	15Kh12VNF	MPTU 4909-54		0.11	0.6	0.4	0.030	0.030	11.0-13.0	0.5-1.0	0.4-0.6	0.7-1.0					0.15-0.30	
803	Rh6TF			1.0	0.45	0.35												
811	1Kh21N5T 1Kh21N5G 1Kh21N5B	GOST 5632-61		0.09- 0.14	0.80	0.80	0.035	0.025	20-22	4.8-5.8		5xC- 0.02 to 0.5max					Nb-5xC 0.02 to 0.03 max	
812																		
813	1Kh25N25TR Kh25N25TR Kh24N25T	GOST 5632-61		0.07- 0.12	1.00- 2.00	0.80- 0.035	0.020	23.0- 26.0	24.0- 27.0			1.10- 1.60					0.016	

EI No.	Alloy Designation	Specifi- cation	Nearest Equivalent	Chemical Composition, percent (maximum values given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
826			0.85- 0.95	0.35- 0.70- 0.90			7.00- 9.00		0.30		2.00- 2.50		2.40- 2.85					
825																		
826	GOST 5632-61		0.12	0.5	0.6	0.015	0.09	13.0-	bal.	2.5- 4.0	5.0- 7.0	1.7- 2.2	2.4- 2.9			0.015	Fe-5%	Ce-0.02
827		Nimonic	0.02		0.14					9.6	bal.	9.6						Fe-1.37
828	(nickel-base alloy)																	
835	Kh25M16G7AR	GOST 5632-61	0.12	5.00- 7.00	1.00	0.035	0.020	23.0-	15.0- 26.0						0.020	N-0.3- 0.45		
839			0.40- 0.50	16-18	0.30- 0.70	0.06	0.03	0.50	0.50						2.40- 3.50			
842	00R110	GOST	0.09	0.60	0.80													
846	(stainless)															0.1- 0.5		

HT No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, Percent (maximum unless given as range)													
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B
637	Kh16M17GB Kh16M17JB	GOST 5632-61		0.09	0.60	0.80	0.035	0.020	15.0- 17.0	14.0- 16.0	2.50- 3.00						Nb-0.05- 0.09
638	Kh13Mn9V3B																
639	(stainless)																
642	Kh16M2M2			0.12	2.0	3.0	0.03	0.03	15-17 (estimated composition)	1						Nb-2	
643	Cr-Mn austentic																
650	Kh16M17SA	GOST 5595-56		0.12	0.8- 1.0	0.4	0.03	0.03	14-16	24-26	5-6						
651																	
652																	
653	Kh13Mn4G3B			0.1	0.3	0.6			8.5- 10.5	bal.	9- 11.5	4-6	4.2- 4.9			0.02	4-6 Fe-4.0 Cr-0.02
654				0.10	0.50	0.80	0.013	0.013	23.5- 26.5	bal.	13.0- 16.0	0.30- 0.70	0.50			Fe-4%	
655				0.8	1.0	0.8	0.026	0.020	14-17	bal.	1.5- 1.9	1.1- 1.4	0.005	Zr-3.0 Nb-1.0 Ti-1.5	0.003		

HT No.	Alloy Designation	Specification	Nominal Equivalent	Chemical Composition, percent (maximum unless given as range)										Al	Cu	B	Co	Nitrogen
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
612				0.05	0.91	0.32	0.02	0.016	16.73	bal.				0.88				1.5-2.45
613	Kh17TA4M9 Kh17GOM5	GOST 5632-61																H-0.15- 0.25
613	R-13WV1ashB			0.12	8.0- 10.5	0.8-	0.035	0.020	16-18	3.5- 4.5								
623																		
623				0.12	2.0	3-5	0.03	0.03	12-14	13-15 (estimated composition)								
623																		
623																		
623				0.1	0.8	1.0	0.03	0.03	21-24	bal.	0.6- 1.2	4.5- 6.5	0.8- 1.2	2.3- 3.0				
623																		
902	Kh17GOM3B								0.05- 0.10	1.8- 2.2	0.20- 0.45	18.5- 20.5	8-10		1.3- 1.8			Nb-1.0- 1.4
903									0.10	1.0- 2.0	0.6		18-20	9-11	2.0- 3.0			Nb-0.9- 1.3
903									0.30- 0.40	16.0- 18.0	0.50	0.030	0.030	0.60	0.50			4.75- 5.50

Ex- No.	Alloy Designation	Specifi- cation	Chemical Composition, percent (maximum unless given as range)															
			Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
901	KAIJIGU (SW-2)	GOST 5632-61		0.09	0.80	0.80	0.035	0.025	14-16	7-9.4					0.70- 1.30			
905	08Kh22N5G1F			0.07	0.10	0.33	0.007	0.009	21.2 (not to 1. one analysis)	4.92	0.11	0.10	0.11					N-0.20
906	Heat-treating-resisting, High-carbon SS																	
907	" " "																	
908	" " "																	
909	20Kh13M1			0.18-	0.25-	0.15-					1.0-	0.4	0.8-		0.7-			
				0.25	0.50	0.35				1.3		1.2			0.9			
913				0.10-	0.14-	0.03	0.03	0.03	1.7-	0.3	0.4-	0.6		0.05-	0.20-			
				0.15	0.17	0.35			2.2					0.10	0.35			
914	0Kh18NiCr2	GOST 5632-61		0.08	1-2	0.80			17-19	9-11				0.50-	0.60			
915	R14F4	GOST 5652-60		1.2-	0.4	0.03	0.03	0.03	4.0-	0.4-	0.3	13.0-	14.5	3.5-	4.1			
916	R18F2, R18F	GOST 5952-51		1.2					4.6									
917	R18F2M	GOST 9373-60		0.85-	0.4	0.4	0.03	0.03	3.0-	0.4	0.5-	17.5-	19.0	1.8-	2.2			
918	R24F			0.85-	0.95				4.0-	4.6	0.4	22.0	24.0	1.8-	2.2			

EI No.	Alloy Designation	Specification	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)												
				C	Mn	Si	P	S	Cr	Ni	Mo	W	V	Al	Cu	B
918	R9180	GOST 9573-60		0.8-0.9	0.4	0.03	0.03	3.8-4.4	0.4	0.3	9.0-10.5		1.6-2.2			9.5-10.5
919	R9190			0.9-1.0				3.8-4.4			9.0-10.5		2.2-2.6			9.5-10.5
920				0.45	14.12	2.4	0.010	0.011	17.3			0.48				
921	Kh17M53 (Sh-3)	AM 350		0.06-0.10	0.7	0.035	0.020	16-17.5	4.5-5.5	3.0-3.5						
922	(Peryllium steel)															
923	VZh 36-300	GOST 5632-61		0.12	0.5	0.5										
924																
925	MOK55, RIOT55	GOST 5952-51		1.45-1.55	0.4	0.03	0.03	4.0-4.6	0.4	0.3	10.0-11.5		1.4-2.0	0.2-0.8	3.6-4.5	0.02-0.1
926																
927																

E.I. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum values given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
910 Ric 542	GOST 5952-51			0.8- 0.9	0.4	0.4	0.03	0.03	3.0- 4.4	0.4	0.3	17.5- 19.0	2.0- 2.5					5.0- 5.5
913	GOST 2733D3T 0.5523, 0.553D3T GOST 5632-61																	
914	(Picot Metal)																	
915	25Ni183W	GOST 533-61		0.21- 0.28	0.7	0.3- 0.8	0.030	0.030	17.0- 19.0	7.5- 8.5	2.0- 2.5							
922	15Ni12VAT	GOST 5632-61		0.11- 0.18	0.6- 1.0	0.40	0.030	0.030	11.0- 13.0	0.5- 1.0	0.4- 1.6	0.7- 1.0	0.15- 0.30					
923	Khrest			0.09	0.79	0.024	0.016	0.016	10.75 (actual analysis)	11.0			1.05	1.05				
924	Kh25Ni5MnT			0.09	0.44	0.63	0.025	0.025	24.3	5.35	0.10	0.10	0.11					N-C.O.M
926	4Kh4VFM			0.35- 0.45	0.20- 0.40	0.6- 1.0	0.03	0.03	4.0- 5.0									

EI No.	Alloy Designation	Nearest Equivalent Specification	Chemical Composition, percent (maximum unless given as range)															
			C	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	V	Al	Cu	B	C ₂	C ₃
970	45Cr15	GB/TU 91-53	0.35- 0.45-	0.35- 1.2	0.03- 1.2	0.03- 1.2	0.03- 1.2	4.5- 5.5	0.3	1.6- 2.4	0.03							
971	45Cr15M	GB/TU 91-53	0.35- 0.45-	0.35- 0.45	0.5- 0.6				2-3	0.3	0.4- 0.6	4.5- 5.5	0.8- 1.2					
972	15Cr12V	GB/T 5632-61	0.10- 0.16	0.60- 0.65	0.030- 0.025	0.025- 0.020	0.025- 0.020	10.5- 12.0	1.5- 1.8	0.35- 0.60	1.60	0.18- 0.30						
973	10Cr12VWF 10Cr12VAD		0.09- 0.13	0.6- 0.7	0.03- 0.025	0.03- 0.025	0.03- 0.025	10.5- 12.0	1.4- 1.8	0.35- 0.50	1.50- 2.0	0.19- 0.30						0.004
974	15Kh12MVF																	
975	95Cr18V																	
976	16Cr17NiXu	GB/T 5632-61	0.95- 1.02	0.7- 1.0					0.7- 1.0		0.6- 1.0							
977																		
978																	0.80- 1.30	

EQUIVALENT ELEMENTS AND ALLOYS

Alloy No.	Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)										Co	Cr	Mn	Si	P	S	Cr	Ni	Mo	V	Ti	Al	Cu	β
				C	N	O	0.03	15.0-	13.0-	15.0-	15.0	2.0-	2.75														
17	11Ni3.04V2R	GOST 5632-61		0.07 0.12	1.0- 2.0	0.6	0.03	0.03	15.0- 18.0	13.0- 15.0	15.0-	15.0	2.0- 2.75														
19	1121AN3																										
20	Rh22N5.69				0.05- 0.09	6.0- 10.0	0.8	0.035	0.035	21.0- 23.0	4.5- 5.5																
21																											
25	11Ni8M2A05				0.01	1.6	0.8	0.035	0.035	17-20	1.5- 2.5																
27																											
33																											
35	Rh12Ni22Ti3Mg	GOST 5632-61			0.10	0.60	0.60	0.020	0.010	10.0- 12.5	21.0- 25.0	1.00- 1.60															
39																											

Ref. No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
5	20ALSiMg 23Mn2AlWTA	ChMTU 455-61		0.2	2.0	1.0	0.03	0.03	12-14	1-2	1			0.5				
73	Ru25Mn2P																	
81	43Al4V3P			0.12	2.0	1.0	0.3	0.3	24-26	11-13				0.5				
87	06Kh25Mn2Yu Kh25Mn2Yu	ChMTU 168-59		0.35- 0.45	0.8- 1.2	0.7- 1.0	0.04	3.6- 4.1	0.3	2.5- 3.0				0.2- 0.4				
88	08Kh15Mn23Cr7V7I2	ChMTU		0.07	0.8	0.6- 1.0	0.03	0.03	24-26	11-13				0.6- 0.9				
89	05Kh20N11M3TB Kh15Mn10N3TB	ChMTU 170-59	AISI 316	0.07	0.8	0.5- 1.0	0.03	0.03	16-21	10-11	2.5- 3.5			0.06- 0.09			No-0.5- 0.9	
105	GOST 5632-61			0.1	0.6	0.6					12.0- 15.0	33.0- 37.0	3.0- 3.8		2.4- 2.6		0.01	0<-0.1

EP No.	Alloy Designation	Specifi- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)												
				C	Mn	Si	P	S	Ni	Mo	V	Ti	V	Al	Cu	Others:
166	Kh20Ti25V7BER (VKh-100)			0.1	1.5	0.6			19-22	25-30	2.8- 3.5	4.8- 6.0			0.005	N-0.15-0.3 Nb-0.7-L ₃
167	20Kh22N15G7TA 275-60	ChMTU	0.18- 0.25	6-8	0.35	0.025	0.025	0.025	19-22	14-16		0.6- 1.0				N-0.25- 0.45
155	08Kh20M10S2Anyu 275-60	ChMTU	0.10	1.0- 2.0	2.0- 2.5	0.03	0.03	0.03	19-21	8-10		0.5- 1.0	0.3- 0.7			Nb-10.6- 1.0
163	08Kh15N30G7V3T		0.08	6-8	1.0	0.03	0.02	0.02	14-16	29-31	2-4	0.5 (estimated precipitation)				
164	Kh25Ni21V4T								(same as EP-725A)							
165	(Austenitic)														0.37	
169															0.53	
170															0.69	

P. No.	Alloy Designation	Nearest Equivalent	Chemical Composition, percent (maximum weight given in parentheses)										B=0.005	
			C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	
MF														
MF	CA-MU 320-60		0.11- 0.17	0.65- 0.95	0.10- 0.80			1.3- 1.7	1.6- 2.0	0.20- 0.35	0.60- 1.0			
MF	2C-3Mn-Fe													
MF	(Mn-Cr-Ni) 60													
MF	1.5%													
MF	207	Permendur 2-V	0.03	0.20	0.10	0.014	0.010 (approximate composition)						1.8	50
MF	207													
MF	207													
MF	207													
MF	207													
MF	207													
MF	207													

EP No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)													
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B
232	Kh15Cr4N	CrMnU 444-61		0.12	13.0- 15.0	0.80	0.035	0.020	13.0- 15.0	1.0- 1.5							
233	Kh17Cr4	CrMnU 5632-61		0.15	13.5- 15.5	0.80	0.035	0.020	16.0- 18.0	0.60							H-O-30- 0.4G
234	Kh21Ni3T	CrMnNi3T		0.06	1.6	0.45			21.0	3.4							
									(actual analysis)	0.26							
235	Kh15Cr2Ti																
236	Kh17Cr2Ni5T																
237	06Kh14Mn9Cr8V63B	CrMnU 392-61															
238	06Kh15Ni3Cr8V74ST	CrMnU 400-61		0.08	7.0- 8.5	0.35											
239	06Kh14Ni9Cr3V63B	CrMnU 400-61															

IP No.	Alloy Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum unless given as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cr	B	C ₂
245 (similar to IP-317) CrNiU Reinforced 80-16-2																		Ferro-C ₂ 0.30-0.45
257																		
263																		
278																		
283	Kh16-5			0.05- 0.09	1.0 0.09	0.7	0.035	0.02	0.035	30-33	7-9				0.15			
302	15170-2333																	(similar to 15170-2333 except 7% carbon)

EPR No.	Alloy Designation	Specific- cation	Chemical Composition, percent (maximum unless given as range)															
			Nearest Equivalent	C	Mn	Si	P	S	Cr	Ni	Mo	W	Tl	V	Al	Cu	B	Co
371	WRG-5																	
374	WRG-6																	
377	WRG-7 (EP-245)	CRMU/TEN/Tenmet 639-62																Cr=9.8
378	E.G.3																	
379	Kh15N6M15																	
380	Kh15N5M16V																	
381	CRM16M15B																	

No.	Alloy No.	Designation	Specific- cation	Nearest Equivalent	Chemical Composition, percent (maximum values given as range)														
					C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	A	B	C ₂	D
360	C-115M1252RL E-158M157-1A	ChMnU 846-63																	
361	03M18M11ERI E-124M1253L	ChMnU 847-63																	
363	03M15M30G5V3RL	ChMnU 668-62																	
365	132M1252RL																		
368	KAL7C9AN5MA																		
370																			
375																			

Ref. No.	Alloy Designation	Specific- eistica	Nearest Equivalent	Chemical Composition, Percent (maximum and minimum as range)														
				C	Mn	Si	P	S	Cr	Ni	Mo	W	Ti	V	Al	Cu	B	Co
163	SA-CH3M	CH3M/192-53																
164	SA-CH2M	CH2M/192-53																
165	WTOM277	Hastelloy B	0.03	0.5	1.0										25-29			Fe-1.5
165	WTOM278			0.05	0.5	0.5									25-29	1.4-1.7		Fe-4.0
531	WTOM281																	

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